

**Course Syllabus**  
**MBMB 646 Proteomics technology and applications**  
**Academic Year 2025**

**Course ID and Title:** MBMB 646 Proteomics technology and applications

**Course Coordinator:** Dr. Duangnapa Kovanich, Ph.D.

Email: kovanich@hotmail.com

**Instructor:** Dr. Duangnapa Kovanich, Ph.D.

**Credits:** 1(1-0-2)

**Curriculum:** Master of Science Program in Molecular and Integrative Biosciences (Elective course)  
 Doctor of Philosophy Program in Molecular and Integrative Biosciences (Elective course)

**Semester:** 2/2568

**Pre-Requisites:**

None.

**Course Learning Outcomes (CLOs):**

By the end of the course, students should be able to:

1. Explain the fundamental principles and practical applications of mass spectrometry–based proteomics.
2. Describe standard workflows used for large-scale protein analysis.
3. Demonstrate an understanding of quantitative strategies in proteome analysis.
4. Identify and quantify proteins using mass spectrometry data and appropriate analytical tools.
5. Explain the approaches used to analyze post-translational modifications and protein–protein interactions.

**Alignment of Teaching and Assessment Methods to Course Learning Outcomes:**

<b>Course Learning Outcomes</b>	<b>Teaching Method</b>	<b>Assessment Method</b>
1. Explain the fundamental principles and practical applications of mass spectrometry–based proteomics.	Lecture	Assignment
2. Describe standard workflows used for large-scale protein analysis	Lecture	Assignment
3. Demonstrate an understanding of	Lecture	Assignment

Course Learning Outcomes	Teaching Method	Assessment Method
quantitative strategies in proteome analysis.		
4. Identify and quantify proteins using mass spectrometry data and appropriate analytical tools.	Lecture	Assignment
5. Explain the approaches used to analyze post-translational modifications and protein-protein interactions.	Lecture	Assignment

### Course Description:

This course aims to provide students with a comprehensive understanding of mass spectrometry and its application in proteomics. It equips them with the knowledge and skills necessary to design and conduct proteomics experiments, from sample preparation to data analysis, while keeping up-to-date with the latest advancements in mass spectrometry technology.

### Course Schedule:

(Classroom A409)

	Activities	Description	Time	Instructors and Assistants
<b>Monday, Apr 27, 2026</b>				
1	Lecture	Introduction to mass spectrometry and LC-MS/MS for proteomics	13.00-16.00	DK
<b>Tuesday, Apr 28, 2026</b>				
2	Lecture	Proteomics workflows and protein identification	13.00-16.00	DK
<b>Wednesday, Apr 29, 2026</b>				
3	Lecture	Proteomics data analysis and repository	13.00-16.00	DK
<b>Thursday, Apr 30, 2026</b>				
4	Lecture and Class Discussion	Proteomics of protein post-translation modification	13.00-16.00	DK
<b>Friday, May 01, 2026</b>				
5	Lecture and Class Discussion	Protein-protein interaction analysis	13.00-16.00	DK

**Assessment Criteria:**

<b>Assessment Criteria</b>		<b>Description (in Details)</b>	<b>Scoring Rubric</b>
<b>1</b>	<b>Class Attendance (10%)</b>	Showing up in the class (5%)	<ul style="list-style-type: none"> <li>• Full attendance (4)</li> <li>• ~ 80% attendance (3)</li> <li>• ~ 60% attendance (2)</li> <li>• &lt; 50% attendance (1)</li> </ul>
<b>2</b>	<b>Assignment (90%)</b>	Correctness and accuracy (40%)	<ul style="list-style-type: none"> <li>• Excellent (4): All analyses are correct; no conceptual errors; strong evidence of scientific understanding.</li> <li>• Good (3): Mostly correct with minor inaccuracies; demonstrates solid understanding.</li> <li>• Fair (2): Noticeable inaccuracies or misinterpretations; partial understanding.</li> <li>• Needs Improvement (1): Major errors; limited understanding of key concepts.</li> </ul>
		Completeness of Content (20%)	<ul style="list-style-type: none"> <li>• Excellent (4): All required sections fully addressed; comprehensive responses.</li> <li>• Good (3): Most components included; minor omissions.</li> <li>• Fair (2): Some sections incomplete; missing relevant information.</li> <li>• Needs Improvement (1): Major sections incomplete or missing.</li> </ul>
		Scientific Reasoning and Depth of Analysis (30%)	<ul style="list-style-type: none"> <li>• Excellent (4): Demonstrates critical thinking; integrates advanced concepts; coherent justification.</li> <li>• Good (3): Good reasoning with moderate depth; some analysis provided.</li> <li>• Fair (2): Limited analysis; descriptions without deeper interpretation.</li> </ul>

Assessment Criteria	Description (in Details)	Scoring Rubric
		<ul style="list-style-type: none"> <li>• Needs Improvement (1): Minimal reasoning; lacks analytical depth.</li> </ul>
	Organization, Structure, and Clarity (10%)	<ul style="list-style-type: none"> <li>• Excellent (4): Well-structured, logical flow, clear academic writing.</li> <li>• Good (3): Minor issues in clarity or flow; overall understandable.</li> <li>• Fair (2): Some organizational problems; clarity occasionally compromised.</li> <li>• Needs Improvement (1): Poor structure; difficult to follow.</li> </ul>

**Student's achievement will be graded using symbols: A, B+, B, C+, C, D+, D, and F, based on the criteria as follows:**

Percentage	Grade	Description
80–100	A	Excellent
75–79	B+	Very Good
70–74	B	Good
65–69	C+	Fairly Good
60–64	C	Fair
55–59	D+	Poor
50–54	D	Very Poor
0–49	F	Fail

**Date of Revision:** 14 Nov 2025